

Appl. No. 10/617,620

Docket No. RTN-141PUS

Amendments to the Claims:

This listing of the claims will replace all prior versions, and listings, of the claims in the application:

- 1 1. (Original) A radiator element comprising:
2 a pair of fin-shaped substrates spaced apart from one another, each having a transition
3 section and a feed surface;
4 a balanced symmetrical feed having a pair of radio frequency (RF) feed lines disposed
5 adjacent to and electromagnetically coupled to a corresponding one of the feed surfaces; and
6 wherein the pair of radio frequency feed lines forms a signal null point adjacent the
7 transition sections.
- 1 2. (Original) The radiator element of Claim 1 wherein:
2 the balanced symmetrical feed further comprises a housing having a plurality of sidewalls
3 forming a cavity; and
4 the pair of feed lines are each disposed on a corresponding one of the sidewalls and
5 comprise a microstrip transmission line.
- 1 3. (Original) The radiator element of Claim 1 wherein the pair of fin-shaped substrates are
2 disposed to form a tapered slot.
- 1 4. (Original) The radiator element of Claim 1 wherein the balanced symmetrical feed is a raised
2 balanced symmetrical feed.
- 1 5. (Original) The radiator element of Claim 1 wherein a first one of the pair of radio frequency
2 feed lines is adapted for receiving a radio frequency signal and a second one of the pair of radio
3 frequency feed lines is adapted for receiving a radio frequency signal phase shifted by
4 approximately 180 degrees.
- 1 6. (Original) The radiator element of Claim 1 wherein the pair of substrates are provided from
2 an electrically conductive material.

Appl. No. 10/617,620

Docket No. RTN-141PUS

1 7. (Original) The radiator element of Claim 6 wherein the pair of substrates comprise copper
2 plated metal.

1 8. (Original) The radiator element of Claim 1 wherein the pair of substrates comprise a
2 metalized substrate.

1 9. (Original) The radiator element of Claim 1 wherein each of the substrates has a height of less
2 than approximately $0.25\lambda_L$, where λ_L refers to the wavelength of the low end of a range of
3 operating wavelengths.

1 10. (Original) The radiator element of Claim 1 further comprising:
2 a second pair of substrates spaced apart from one another each having a transition section
3 forming a second tapered slot and having a second feed surface wherein the second pair of
4 substrates form a plane which is substantially orthogonal to a plane formed by the first pair of
5 substrates;

6 wherein the balanced symmetrical feed includes a second pair of radio frequency feed
7 lines each disposed adjacent to and electromagnetically coupled to the feed surface of one of the
8 second pair of transitions; and

9 wherein the second pair of radio frequency feed lines are electromagnetically coupled to
10 the second feed surfaces adjacent the signal null point.

1 11. (Original) The radiator element of Claim 1 wherein each of the feed surfaces has a first
2 portion in a first plane and a second portion in a second plane, wherein the first plane forms an
3 angle of from about 91 degrees to about 180 with the second plane.

1 12. (Original) The radiator element of Claim 1 wherein the balanced symmetrical feed further
2 comprises:

3 a cavity having a plurality of sidewall surfaces and a top surface disposed adjacent the
4 pair of radio frequency feed lines; and

Appl. No. 10/617,620

Docket No. RTN-141PUS

5 a pair of transmission feed lines, each disposed adjacent to an opposing corresponding
6 sidewall surface of said cavity and having a first feed end electromagnetically coupled to a
7 corresponding one of the pair of radio frequency feed lines.

1 13. (Original) The radiator element of Claim 12 wherein each of the pair of transmission feed
2 lines further comprise a second feed end; and
3 the radiator element further comprises a balun having a pair of outputs each coupled to a
4 corresponding one of the second feed ends of the pair of transmission feed lines.

1 14. (Original) The radiator element of Claim 13 further comprising a pair of amplifiers each
2 coupled between a corresponding balun output and second feed end of one of the pair of
3 transmission feed lines.

1 15. (Original) A wideband antenna comprising:
2 a cavity plate having a first surface and a second opposing surface;
3 a first plurality of fins disposed on the first surface of the cavity plate spaced apart from
4 one another forming a first plurality of tapered slots having a feed surface;
5 a second plurality of fins disposed on the first surface of the cavity plate spaced apart
6 from one another forming a second plurality of tapered slots, each substantially orthogonal to a
7 corresponding one of the first plurality of tapered slots and having a feed surface; and
8 a plurality of balanced symmetrical feed circuits disposed on the first surface, each
9 having a pair of radio frequency (RF) feed lines electromagnetically coupled to corresponding
10 ones of the feed surfaces.

1 16. (Original) The wideband antenna of Claim 15 wherein the cavity plate further comprises a
2 plurality of apertures; and
3 wherein each of the plurality of balanced symmetrical feed circuits is disposed in a
4 corresponding one of the plurality of apertures.

1 17. (Original) The wideband antenna of Claim 17 further comprising a connector plate disposed
2 adjacent the second surface of the cavity plate and having a plurality of connections;

Appl. No. 10/617,620

Docket No. RTN-141PUS

3 and wherein each of the plurality of balanced symmetrical feed circuits has a plurality of
4 feed connections each coupled to a corresponding one of the plurality of connector plate
5 connections.

1 18. (Original) The antenna of Claim 15 wherein each of the fins has a height of less than about
2 approximately $0.25\lambda_L$, where λ_L refers to the wavelength of the low end of a range of operating
3 wavelengths.

1 19. (Original) The antenna of Claim 15 wherein each of the plurality of balanced symmetrical
2 feed circuits is a raised feed circuit having a shape which conforms to the feed surfaces of a
3 corresponding one of the plurality of fins.

1 20. (Original) The antenna of Claim 15 further comprising a plurality of baluns each coupled to
2 a corresponding RF feed line.

1 21. (Original) The antenna of Claim 20 further comprising a plurality of RF connectors each
2 coupled to a corresponding one of the plurality of baluns.

1 22. (Original) A method for converting the propagation mode of a waveform from a TEM mode
2 to a Floquet mode in a notched radiator element, the method comprising:
3 providing a pair of elements;
4 providing a balanced symmetrical feed circuit having a pair of radio frequency feed lines;
5 coupling the pair of radio frequency feed lines to the elements;
6 feeding the elements with a differential RF signal coupled to each of the pair of radio
7 frequency feed lines.

1 23. (Original) The method of Claim 22 wherein each of the pair of elements comprises a pair of
2 substrates each having a transition section and a feed surface and wherein the transition sections
3 form a tapered notch.

Appl. No. 10/617,620

Docket No. RTN-141PUS

- 1 24. (Original) The method of Claim 23 wherein each of the substrates has a height of less than
- 2 approximately $0.25\lambda_1$, where λ_1 corresponds to the wavelength of the low end of a range of
- 3 operating wavelengths.

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.